Physicist Resource Survey - update

Two pronged attack:
Survey and analysis of experiments'
needs
Survey and analysis of NSF/DOE grants
constant effort

introduction

One year ago, HEPAP University Representatives organized an informal survey

- *of a few of the large experiments' "needs" prior to 2009*

  for faculty/staff, post docs, and graduate students

  in operations/construction and analysis categories

The results suggested a more in-depth review was warranted

This is a review of the status of that effort

- *It has been a large undertaking…*

  Special thanks to:

  - *Ramona Winkelbauer at the NSF*

  - *Brenda Wenzlick at MSU*

  - *Donna Lang, Jim Reidy, Richard Imlay, Saul Gonzalez, PK Williams, Aesook Byon, Mike Procario, and Kathy Turner at DOE*

• email from Fred Gilman charging the Task Force to Study HEP Manpower 7.17.04

Formation of a Working Group to Study HEP Manpower

Following the discussion at the last HEPAP meeting, a Working Group is being formed to assess the question: ==Does the field have the manpower to carry out the experiments to which the U.S. program is committed until the end of the decade?== The members of the Working Group will be drawn from both the HEP community and the agencies, DOE and NSF.

To answer the question at hand, each university and laboratory group will be requested to give its plan for the distribution of faculty/staff/postdocs/students among the various projects with which they are involved for each year through 2009. The funding assumption is constant level of effort, starting with 2004 as the base year.

These data will be compared with those supplied by the relevant collaborations, who will each be asked for their minimum year-by-year manpower needs. In addition, for on-shore experiments, their year-by-year expected U.S. and non-U.S. contributions will be requested.

An initial report from the Working Group will be presentedto HEPAP at its meeting on September 23-24, 2004.

• Membership: Joel Butler, Sekhar Chivukula, *Glen Crawford*, Howard Gordon, Young-Kee Kim, Usha Mallik, Bill Molzon. Chairs: Jim Whitmore and Ray Brock

August/September 2004:

- *Committee jointly prepared*

  letters of introduction and instructions plus spreadsheets, including examples

- *They were sent to:*

  all NSF experimental EPP grant PI's, including CESR

  all DOE HEP grant PI's, including FNAL, BNL, SLAC, ANL, LBL, MITLNS

  Spokespersons (SP) of a selection of experiments agreed upon by the committee

September - last Wednesday:

- *reminding, cadjoling, begging, threatening PI's and spokespeople to respond*

- *Eventually, nearly 100% of PI's responded in a useful way*

- *Essentially all experiments replied*

- *Data analysis started late last week*

PI response from universities and laboratories

Both PI's and SP were sent essentially identical letters

- *PI's:*

"To help us address this important issue, please provide us with the following information *under the assumption that your funding will correspond to a constant level of effort starting in FY2004 and going through FY2009.* Partly as a result of this study, we will learn whether this is an acceptable assumption or not, but please use it for answering this survey."

1)   For this survey, we are only interested in personnel who appear in the mastheads of publications and contribute to the maintenance, operations and/or analysis of experiments. Definitions of FTE for
  - <u>Faculty (Fac):</u> enter the fraction of the person's RESEARCH time;
  - <u>Research Scientist (RS):</u> enter the fraction of the person's TOTAL time;
  - <u>*Postdoc (PD):* enter the fraction of the person's TOTAL time (realizing that part of their activities will likely be data analysis);</u>
  - <u>*Graduate Student (GS):* enter the fraction of the person's TOTAL time (realizing that part of their activities will likely be data analysis);</u>

2)   IF you have strong reasons to change the assumption of constant level of effort (eg a new faculty member coming in a particular year), please state your reasons.

3)   Note that the first year of this survey is an accounting of your current effort and as such are presumably precise numbers. ==Since the strategy for the survey is "constant effort," the sum of each category of personnel is expected to remain equal to the FY2004 totals (although see note 4) through the FY2005-2009 period.== Please estimate the split among projects with the realization that the accuracy may only be at the level of 0.5 FTE.

4)   Since there may be cases where you wish to change FTEs between categories, for this study please use the following conversions: 2 postdocs = 1 Research Scientist or 1 other; and 2 graduate students = 1 postdoc. While these are not intended as direct financial equivalents, they may be useful guides for converting effort between classes of individuals.

This was completed for:

193 groups

81 NSF supported

135 DOE supported

(some with both sources)

53 projects with ≥ 2 PI's responding

597 group-projects

⇒ *~3 projects per group*

We have a scripted machinery to extract fields from 193 spreadsheets, combine, filter, for pivoting giving for 2004:

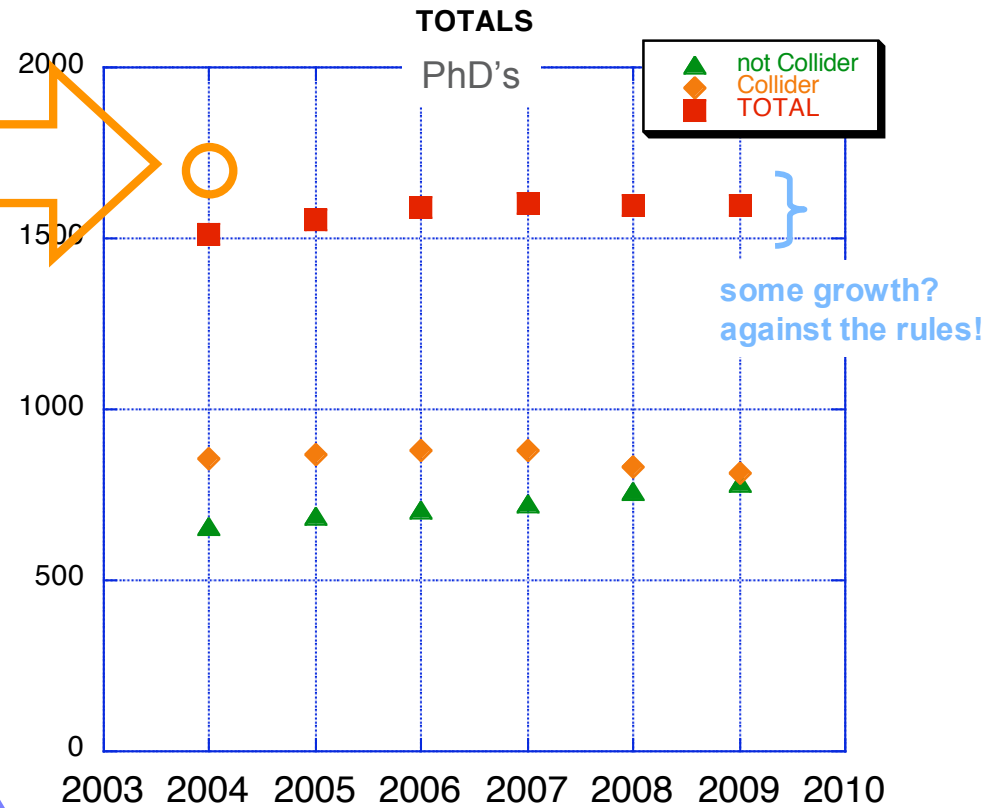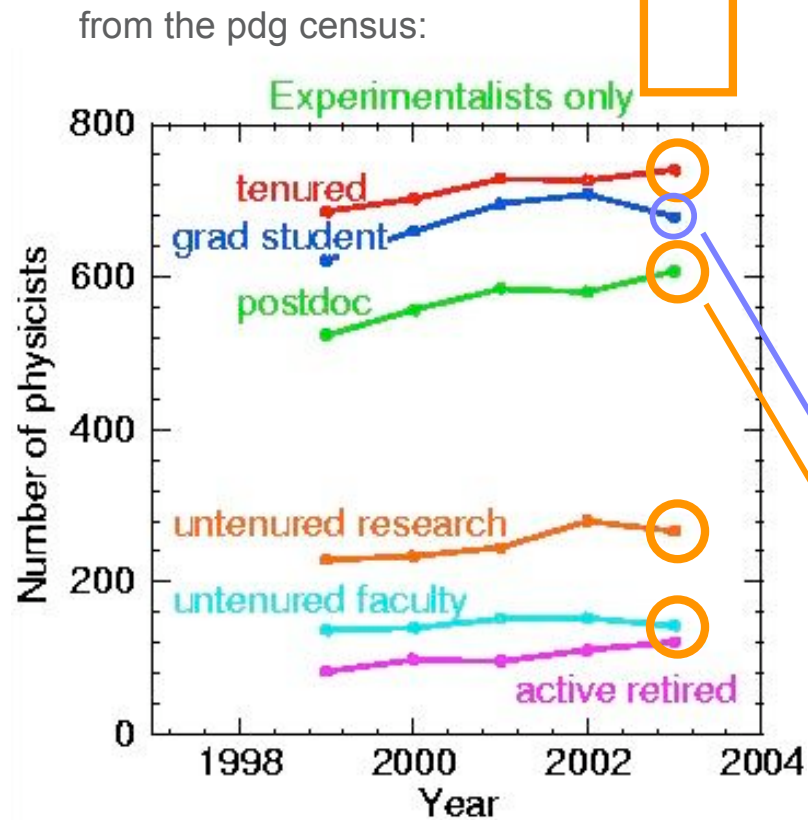711 total faculty

270 research scientists

533 PD

690 GS

by resource (faculty, RS, PS, GS) and by project (experiment)

Ph.D's from the PI's: does it make sense?

Experiments

• *Spokespersons:*

"This present request is now for a "bottoms-up" estimate of your needs, starting with this year (FY2004) and projecting through FY2009 with a special emphasis on making sure that data from each experiment are in the same "currency." The original spreadsheet from last spring has been intentionally replicated as much as possible.

"So, please assess your needs to maintain and operate your experiment at a realistic minimum level of effort. ==There are two emphases in this assessment: a reasonably precise accounting of the current effort within your experiment (the FY2004 numbers) and an accurate estimate of your experiment's needs for out-years.== In order to be concise, we're trying to assess these needs within two broad areas:

"a) **Maintenance and Operations**[1] (including Construction & Commissioning for experiments approved and under construction and/or undergoing upgrades), largely focused on data-taking operations with respect to detectors and beams and

"b) **Data Analysis**[2]."

[1]Operations with respect to computing would include those efforts that go toward regular, production data handling and initial data reduction: operating analysis farms, maintaining cluster operations, scheduling job submission on (sometimes worldwide) clusters, and database designs and maintenance. Physicists from laboratories and universities often lead these efforts. So...the key for overall Operations is on the continuing, largely predictable, tasks of operating (or constructing/commissioning) equipment, taking and processing data and making it available.

[2]Analysis would center on development, including algorithm development for object id and device calibrations, as well as physics results analysis and Monte Carlo development. As "regular" physics analyses proceed, ID, scale determination, things involving deep detector understanding, are often revisited and pursued in parallel or in concert with the physics groups. So, we explicitly include these activities within Analysis, and recognize that predictability is more complicated than for Operations.

We had responses from 18 experiments:

DØ
CDF
BaBar
Minos
BTeV
CLEO
MECO
KOPIO
MiniBooNE
SUPER K
Atlas
CMS
SNAP
STACEE
VERITAS
LIGO
AUGER
MINERvA

outyears: only totals

2004 is a special reporting year: a census within function (Operations/Analysis), within resource (faculty/staff, PD, GS), and within nationality (US, non-US)

n.b. in what comes: occasionally US outyear effort is estimated by scaling from the 2004 US/total fraction

		EXP	A								
		Responder	your name (yourname@expA.lab)								
		date	9/1/04								

| ACTUAL	Personnel	FY 04	NEEDED	Personnel	FY 05	FY 06	FY 07	FY 08	FY 09
operations	FTE **Fac**-US institutions	0	operations	TOTAL FTE **Fac**	5	5			
	FTE host lab **staff**	5							
	FTE **Fac/staff** foreign institutes	0							
operations	FTE **PD**-US institution	7	operations	TOTAL FTE **PD**	12	8.5			
	FTE **PD**-host lab	0							
	FTE **PD**-foreign institutes	3							
operations	FTE **GS**-US institution	5	operations	TOTAL FTE **GS**	10	10			
	FTE **GS**-foreign institutes	5							
	TOTAL OPERATIONS	25		**TOTAL OPERATIONS** expected precision ±10%	27	23.5	0	0	0
analysis	FTE **Fac**-US institutions	25	analysis	TOTAL FTE **Fac**	40	40			
	FTE host lab **physics staff**	5							
	FTE **Fac/staff** foreign institutes	10							
analysis	FTE **PD**-US institution	7	analysis	TOTAL FTE **PD**	10	10			
	FTE **PD**-host lab	0							
	FTE **PD**-foreign institutes	3							
analysis	FTE **GS**-US institutions	10	analysis	TOTAL FTE **GS**	20	20			
	FTE **GS**-foreign institutes	10							
	TOTAL ANALYSIS	70		**TOTAL ANALYSIS** expected precision ±10%	70	70	0	0	0
FTE checksum	**total faculty/staff**	45	FTE checksum	**total faculty/staff**	45	45	0	0	0
FTE checksum	**total PD**	20	FTE checksum	**total PD**	22	18.5	0	0	0
FTE checksum	**total GS**	30	FTE checksum	**total GS**	30	30	0	0	0
major tasks: 2005	upgrade installation, which involves an increase in FTE post docs by 2								
major tasks: 2006	upgrade complete; calibration of new upgrade components								
major tasks: 2007 - 2009									
Any general comments: We are considering another future detector upgrade which might require more personnel.									

Spokespeople: total personnel, 2004

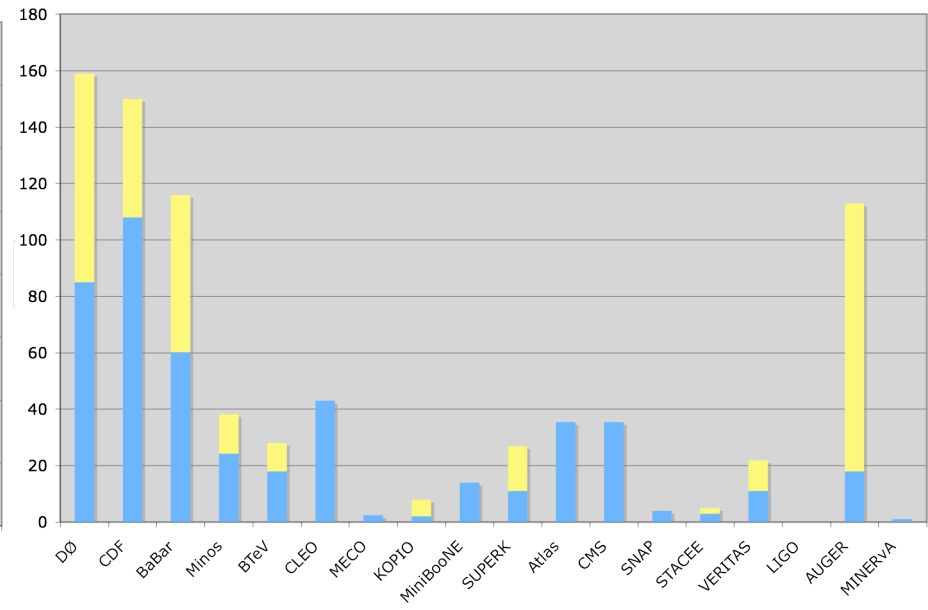collaborations 2004

non-US institution physicists

host lab physicists
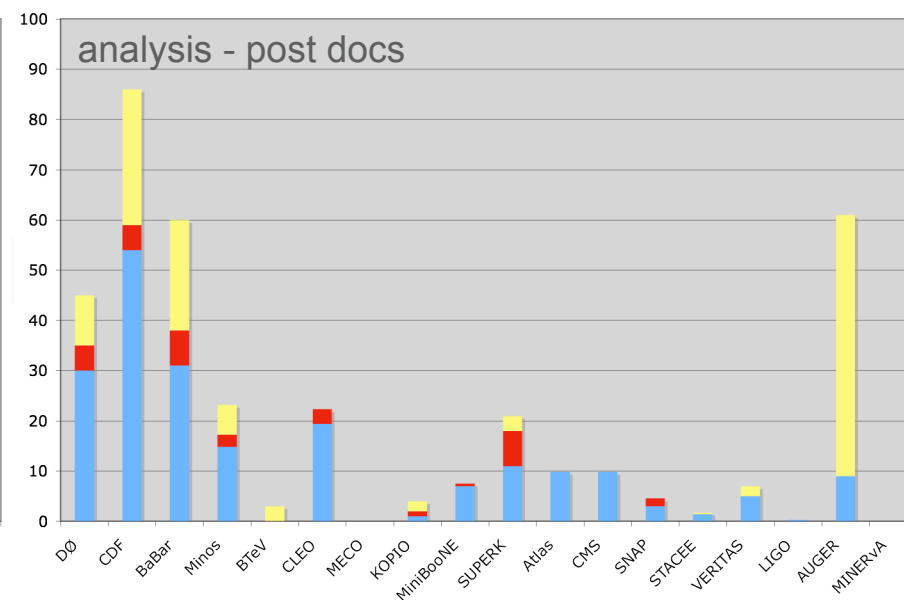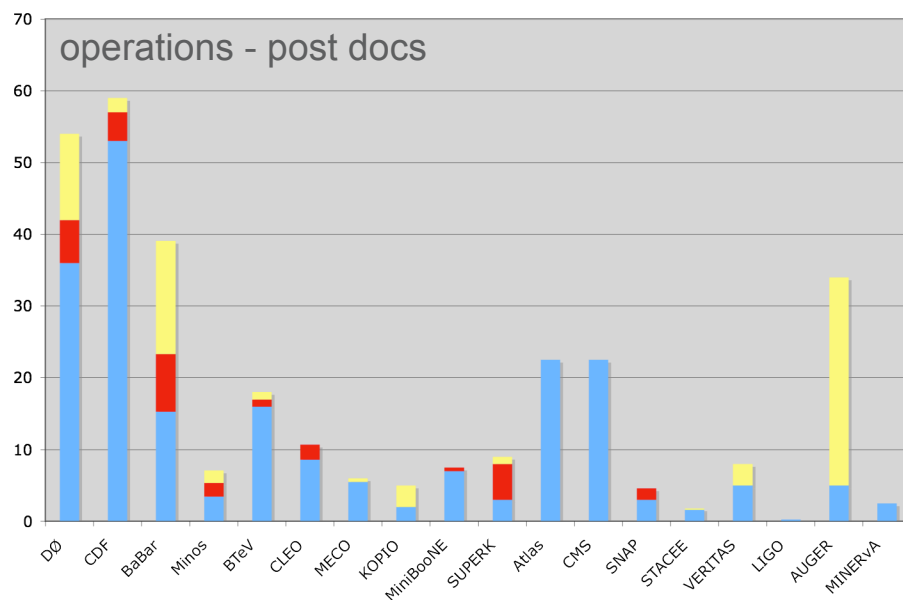
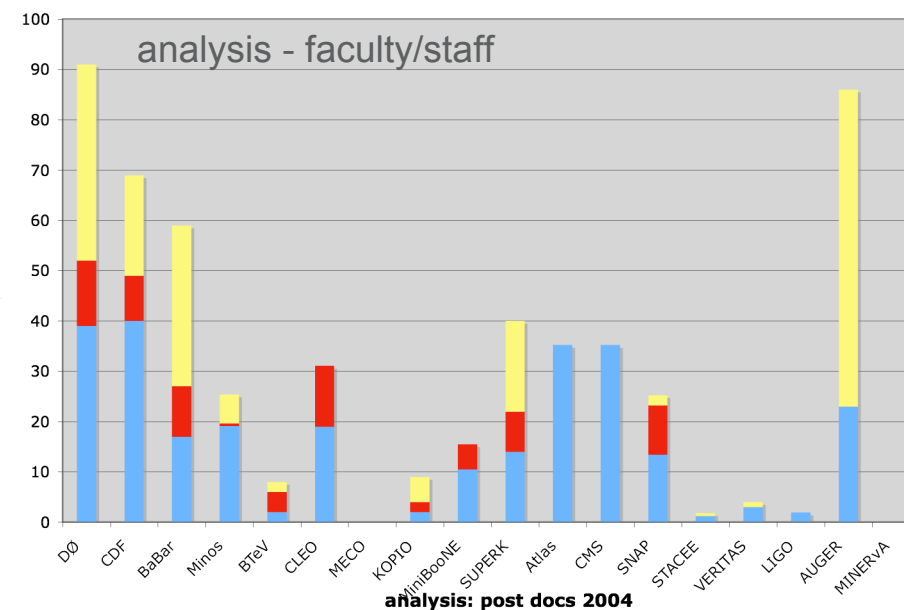US physicists
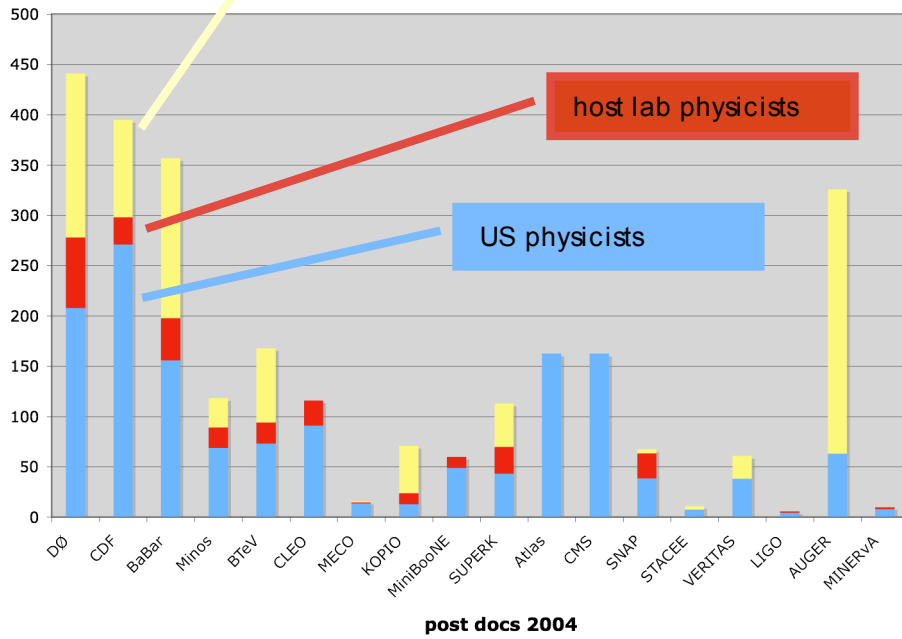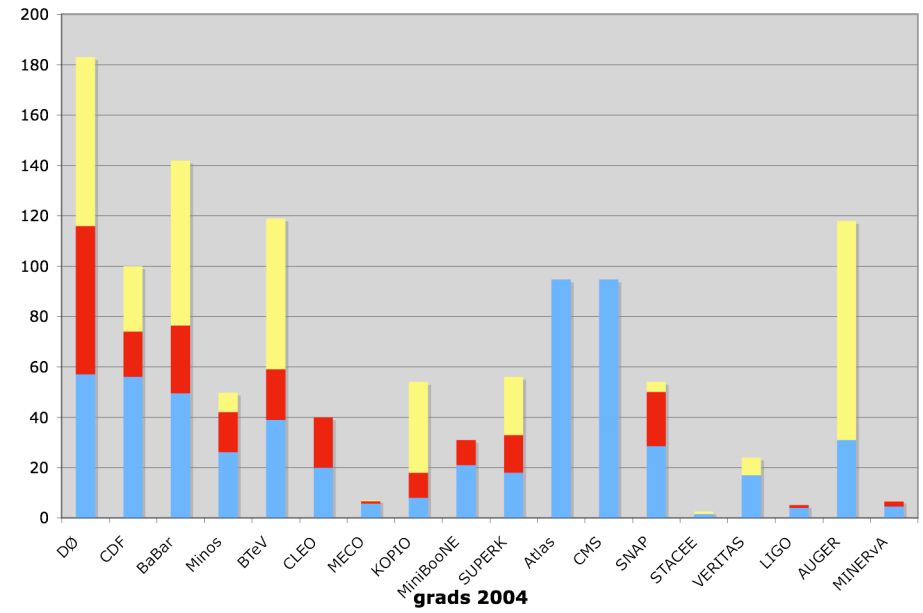
faculty/staff 2004

post docs 2004
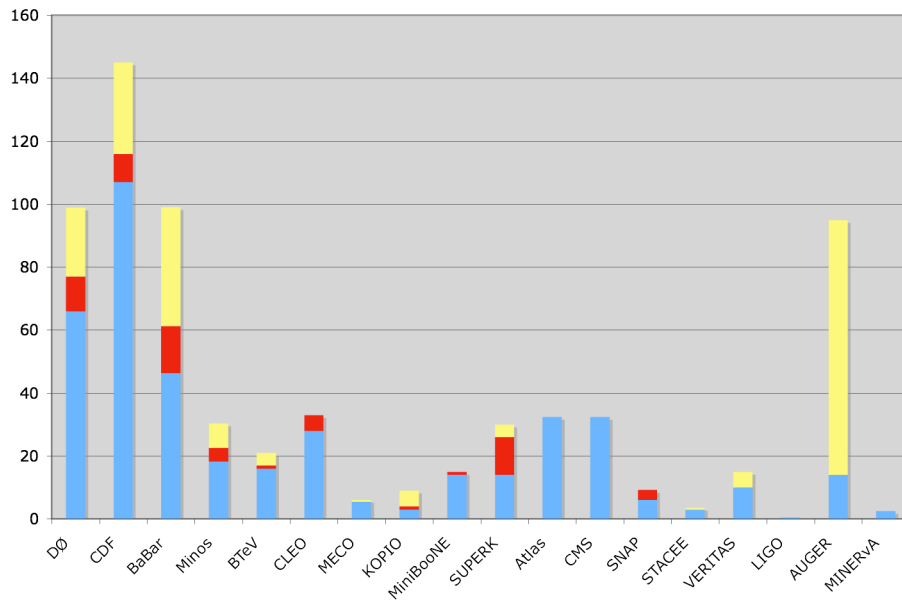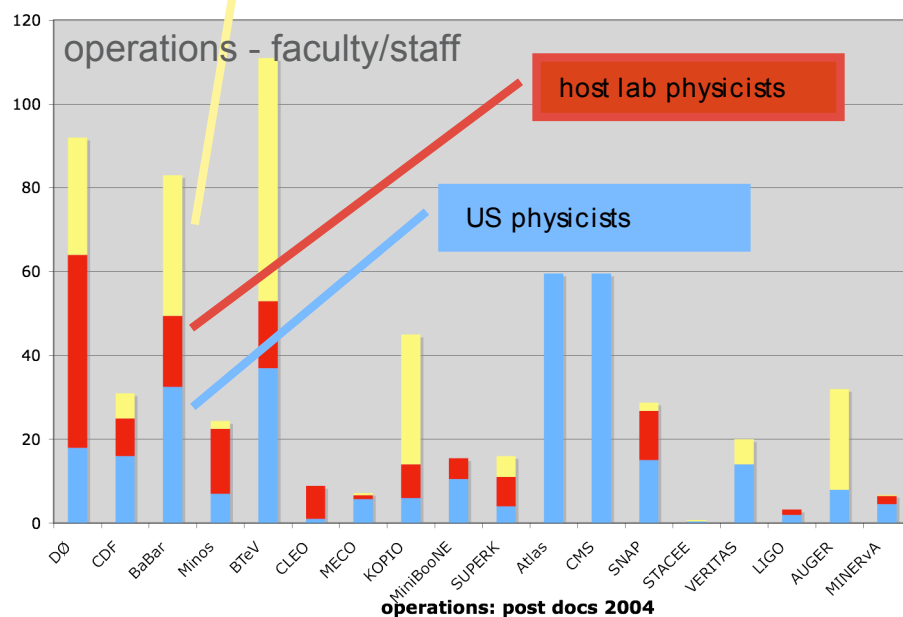
grads 2004

Spokespeople: operations and analysis, Ph.D's 2004

operations: faculty/staff 2004

analysis: faculty/staff 2004

operations: post docs 2004
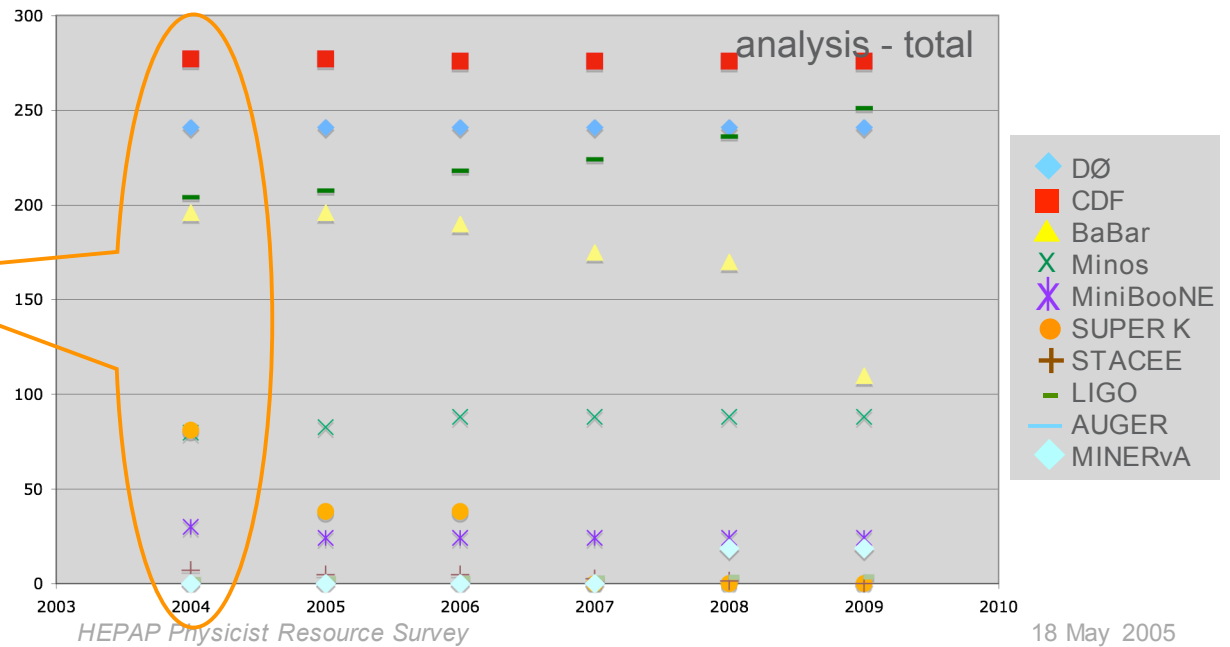
analysis: post docs 2004

Spokespeople: operations/analysis **projections**

operations: running
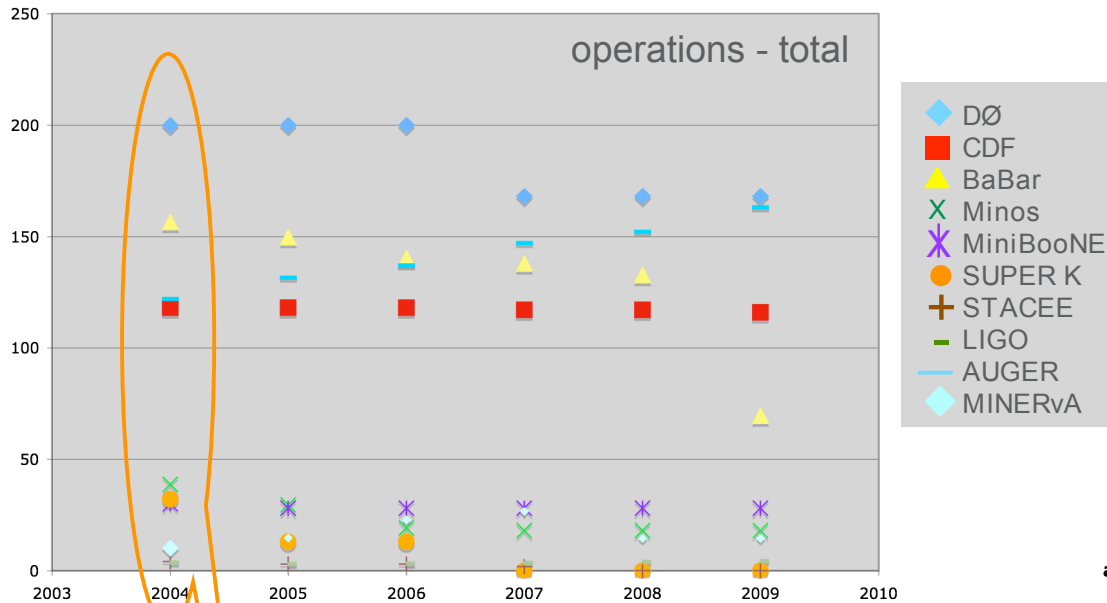
operations - total

Broadly, running experiments needs are not envisioned to diminish in time in either operations or analysis.

analysis: running

analysis - total

previous slides

Legend (operations):
DØ, CDF, BaBar, Minos, MiniBooNE, SUPER K, STACEE, LIGO, AUGER, MINERvA

Legend (analysis):
DØ, CDF, BaBar, Minos, MiniBooNE, SUPER K, STACEE, LIGO, AUGER, MINERvA

PI & experiment-needs: preliminary comparisons

Total Personnel, PI + SP 2004 results:

SP totals

SP US-only totals

PI totals

Conclusion: as a census, the 2004 PI-SP comparison is not crazy…for the large experiments, 10's of people at most
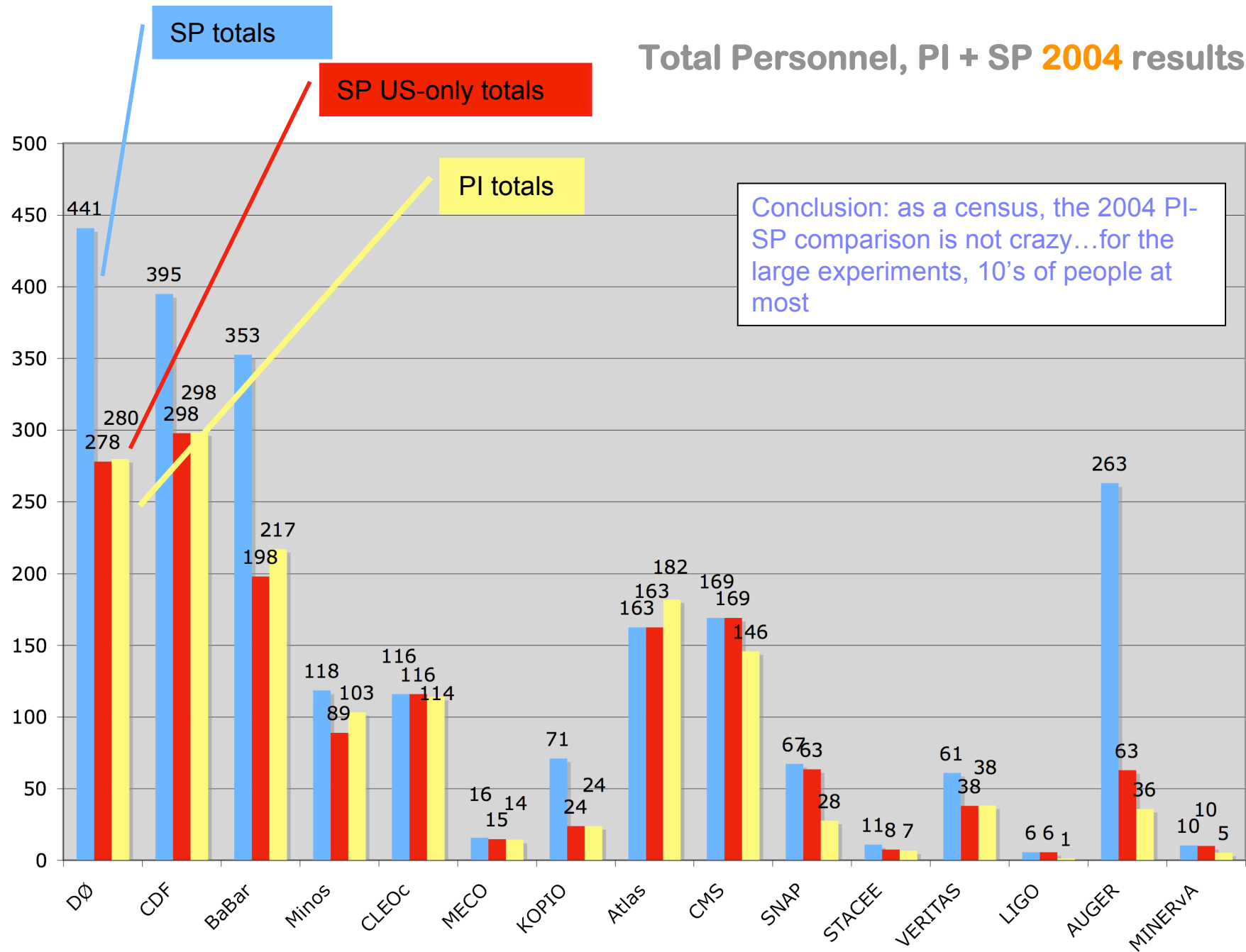
Total Personnel: DØ/CDF & Atlas/CMS - needs

Needs: CDF/DØ ... CMS/Atlas

Legend:
- Atlas SP US (green triangle)
- - CMS SP US (orange diamond)
- - DØ SP US (red square)
- - CDF SP US (blue circle)

DØ / CDF US needs

CMS / Atlas needs
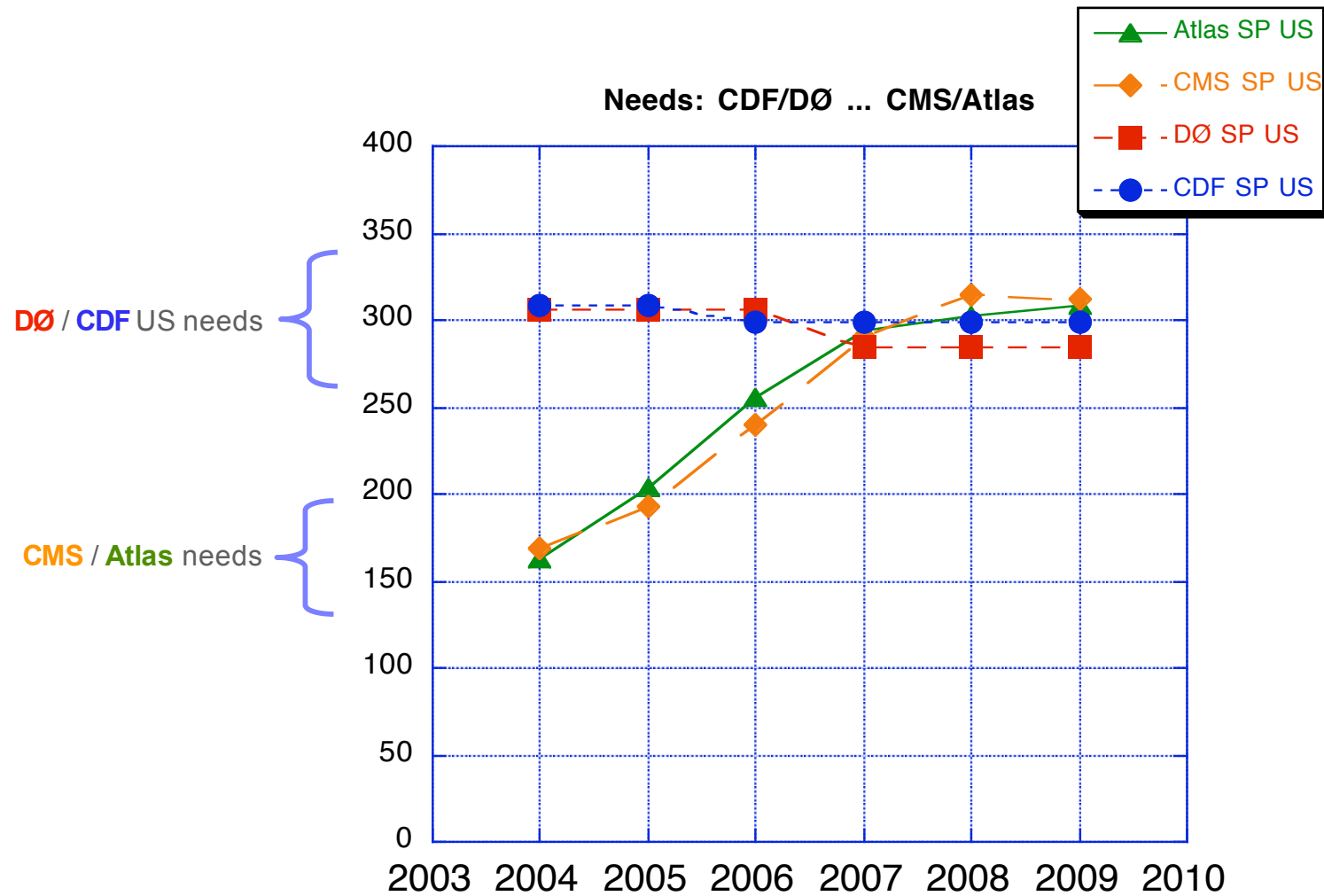
- **The scripted data analysis is too new to report out-year trends…more consistency checking must be done**
    - *No problems have been identified*
    - *It might be worth a more detailed look at the pdg survey for consistency*
    - *We want to do some more by-hand checking from multiple perspectives*
- **The committee needs to "meet" to assimilate the results**
    - *before the next HEPAP meeting*
- **The 250-or so people who worked hard deserve some writeup eventually**